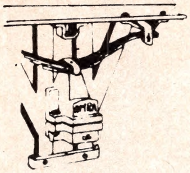

EDITORIAL

JOURNAL BOX

3/79

EDITORIAL

Here we are again - running late. Sorry about that, but getting back to work again left me many things to catch up with, and all my good intentions seem to have done down the drain.

Things are looking up! The Queens-nd Branch members have got together and sent me enough material for one complete Journal, plus a few articles for the next one as well. The next Journal will have 90% material supplied by them.

So what about it all you other members? How about something for Journal from YOU? I received a phone call before the Vic Branch Exhibition from someone promising me an article, and asking me to get in touch with whoever it was. The only thing is that the name did not come out on my tape, and when I rang the number given, whoever answered disclaimed all knowledge.

Pity about that, but I hope that whoever it was reads this and tries to get in touch with me again.

Rex Little
Editor

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ON THE COVER A close look at Peter Bett's SR 2-6-0 kit based loco, which won the Tim Dunlop Cup in the 1979 AMRA competition.

Photo by Jack Parker

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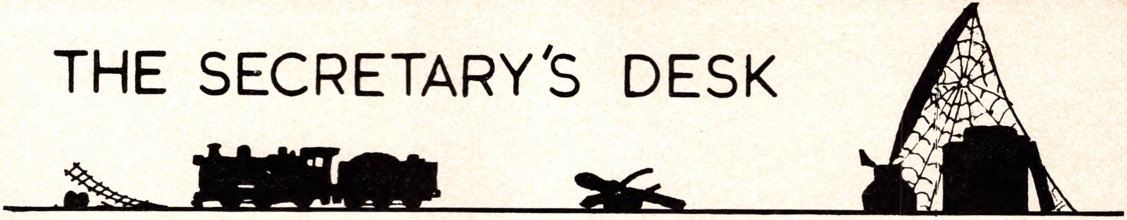
THE SECRETARY'S DESK



We hear and read much on the state of our roads and we are often referred to the marvellous highway systems in the USA. I recently read an article in a reputable magazine that they have deteriorated to such an extent, that some truckies refuse to drive on them, and the Federal Highway Administration has estimated that it will require the expenditure of $25 000 million annually for the next 12 years to bring them back to first class condition, and nothing like this amount is available. The comment on this item was how, for much less, the railway system could be brought up to a standard to handle a greater proportion of the traffic. Shades of opinion out here, but not in the right place.

Our Publishing staff are doing their best to get Journal back on target, but still have to deal with the gremlins which persist. Some of the new members may have wondered why the delay in receiving their first issue, it is not because they have been forgotten, but due to the abovementioned gremlins.

It does have a problem for me in writing this page, when there is such a delay any possible feedback from any of my comments is also delayed. Sometimes I wonder how many read this page, but occasions do arise when someone makes my day by referring to something they read in Secretary's Desk.

In a Pop Valve letter, there is a comment that Journal no longer has the type of articles as of old, this may be so, but I think that the change may be due to changes that have taken place in the hobby. Once the problem was to get a plan and the best material to build the model one wanted. These days, it is more 'what model shall I buy'. I am sure that more people are going for ready to run models than are scratch building these days. It does have the advantage of getting a layout into action much faster, depending on the depth of the pocket. This trend is to be seen at exhibitions, where for a period, there was an upturn in the number of what is termed 'scale layouts' with scratch built rolling stock or hig quality kits of the local prototype. The story is, lack of time for modelling and easier to buy off the shelf. I am quite prepared to buy parts to save time in building a model, as this allows a greater output over a given period, although since I have been involved with A.M.R.A. committess, these periods are mighty long.

It is quite interesting to see a group of the younger members of the NSW Branch getting down to tin tacks and modelling the local prototype. I think this may be starting something of a chain reaction among others to 'have a go'. There must be more satisfaction in seeing one's own efforts in operation. Admittedly, the first results may not take a prize, but with more care and experience from the first attempt many have found that it is not th mountain it was first imagined.

The same may be said about writing an article. At first, the words may be hard to find, but biros are cheap, and with the use of scrap paper for the rough drafts, before long an article of interest to other modellers is produced.

These days, the range of materials which one can use is extensive, but we are not all aware of this fact, or perhaps how to use them. Yet others use them regularly, may be in the course of their work without realising that some are unaware of the possible benefits of the same. So think about the things that you use at work, and if they have a use in the modelling field, drop a note to the Editor so that the rest of the members can be informed.

The membership at 28 February 1979 was as folows:

	Total Feb 78	Renew	New	Aux	Total Feb 79
NSW	290	267	48	7	322
Vic	293	270	15	2	287
Qld	59	56	5	-	61
WA	95	78	12	2	92
SA&NT	12	11	1	-	12
Tas	2	2	-	-	2
ACT	7	6	2	-	8
O/seas	9	8	-	-	8
otal	767	698	83	11	792

Norm Read
Federal Secretary

****

Model railway ideas

By Eric G Watson

INTRODUCTION

It is not intended in this series to present ideas that can be copied as-is on to any one else's layout. Rather, it is hoped the ideas, methods and other data included will help others develop interesting projects for their own layouts.

ARTICLE 1

THE ST HELJAN INTERNATIONAL AIRPORT

This article is chosen as first because of the many problems that had to be solved. It also shows that one can, by taking things slowly and carefully, start by not having a clue as to how to do something - and eventually succeed.

Irrespective of anything else, the most important thing to do before spending time and money on any project is to decide whether or not it is worthwhile - most are not.

This was deemed worthwhile because it filled a gap in the transport system, filled a gap in the scenic theme 'one great and glorious city', it completed the overall theme of my New Type Model Railway, the Sovereign State of St Erics (see separate articles under this title).

In assessing a project, quite often knowing what you cannot do, is as important as knowing what you can do if anything!! Major airports visited were considered, no hope of scratch building or otherwise building anything similar. Other airports visited were considered - I decided I did not want anything like them on my layout. It seemed rather hopeless - which never bothers me much.

What could I do? I could mark out the area with the cheapest, thinnest dowel laid loosely on the base boards I would similarly mark out roads. Airports have car parks - so I marked out a car park and added a few chain store cars and a bus. To avoid repetition, all items are at this stage loose. Airports have control towers - a local shop had an Airfix control tower, so that was put on. Airports have planes. Model planes available were too large, so Chain Store planes were used.

Airports have a main terminal building. No such kits available, but a Faller B 111 station could be done up to suit very nicely. Not available (as usual). The only available kit the right size was a Kibri 9512, but that did not suit.

The roof was left off and a board cut, rails added, very lightly glued at this stage. The idea being to have left and right observation decks, centre kiosk and roof garden cafe - looked unreal. Then I remembered the top section of a Kibri 9514 station kit left over from that glorious composite building 'The Glen Iris Internation Hotel'. A new deck was cut and railed, the section glued on, and the lot carefully positioned. A touch of paint and some Merten figures - the observation deck and world class restaurant.

Then the project of building the St Heljan International Airport was started. A runway system could not be put on, besides which it would be a terrible waste of space on a model railway. A plane was positioned on the west end - the end of the baseboard, so that it gives the impression of moving toward the runways.

Starting at the east end, the car park was finished. The control tower became headquarters for Helico the Air bus people, who already has a network of Heliports around the layout. An air bus and a larger copter were added. Then a stroke of pure genius, a hen house was added - an ideal building for their workshop/hangar!!

The terminal had the smallest square blasa added at the front to improve the platform edges - a gap being left as a path from the exit to Flight No 1 - a Concorde. A tree under the over hanging top deck - and as a finishing touch hedge strips were added at the west end.

Planes were glued down on the west end, in the plane parking bay, while a spare area was considered. A surplus shop was available, but this was no place for a shop. I decided it would do for the St Heljan Aero Club.

Putting finishing touches to scenes is a difficult subject for articles. Possibly a series of colour photos taken as the scene is developed would be needed. Like so often happens, just placed in position, this shop looked unattractive and the whole art of scenic development is to turn this into an attractive, interesting scene.

One inch square tiles were glued down and edged with the thinnest square balsa. One carefully selected tile was removed and a shrub added. The shop positioned, and a couple of small biplanes added to make an attractive, interesting scene - unusual too, not too many would have an Aero Club on their layout.

With a few trees added, the St Helja International Airport was finished. The roads laid out properly, and what was for many years a hopeless dream come true.

Note 1 While the tiles can often be picked up quite cheaply and used as above or for footpaths or paths in parks, they should in all cases be edged both sides. Thin square balsa or thin dowel is quite good, and when added these paths can give a real touch of class to a layout.

Note 2 As I never glue anything directly onto the baseboard, suitable sized pieces of masonite are cut, and the scenes built on to that piece.

TECHNICAL TOPICS: MODEL MOTOR MAINTENANCE

Reprinted From BRMNA Jouranl - January 1978

'A model locomotive is a good as its electric motor', so quoth the Model Press. Whereas this may only be a small particle of the overall picture, the statement has certain merit, in that if the performance of a motor is not up to standard, our beautifully constructed creation will act in a ludicrous manner. Either accelerating from 0 - 60 mph in a second, or conversely pulling away smoothly when lightly loaded, only to sit on the track, quivering, when loaded with anything like a scale rake of coaches. The third horrible possibility, is to have our loco pull away with a jerky motion, and continue with this intermittency right into the middle speed range.

The purpose of this, and following articles is to put in an honest attempt at improvement without too much emphasis being placed on machine shop practices.

Most modellers have a reasonably equipped workshop, but machine tools are not absolutely necessary; take this from a person who has been involved in virtually every facet of modelling for over 30 years, if you do not possess a lathe, drill press, etc, you do not have to despair.

Well, I guess that has dispensed with the literary diarohera, and we will get down to brass tracks. Whether you purchase a motor for your latest little darlin', or a complete loco, the first thing to do is give it a preliminary test run from slow to middle speed range (don't open it right up at this stage), try to ascertain the running characteristics and general performance. If the motor is already installed in a loco, the chances are that the test will show a marked tendency to run more efficiently in one direction, this is a natural phenomenon and can be cured. I will explain why this happens later. In the meantime, should your test have proved your luck is as good as mine, and you've got yourself a real dog, don't worry, it can be fixed.

If you are one of the lucky ones, don't stop reading at this point, you'll get the other sort sooner or later, old chum. Should the motor run sweetly at half power, but seems reluctant to turn slowly, there could be a variety of problems, so go about your checks in a slow and constructive manner. Starting with the brushes, see that the carbon themselves are diametrically opposed to each other when in position on the commutator. Ensure that this is carried out, near enough really isn't good enough. The problem of mass production of brushes, is that they can vary slightly in length, and indeed in quality; this fact alone can cause a modeller severe headaches. This is not really the manufacturer's fault, as tracking down good quality raw material is a difficult business in this modern age. The next step on the agenda is to bed the carbons down; it is absolutely useless trying to 'trouble shoot' your motor further until this is done. A motor is not at its best when the brushes have only point contact. The designer intended the whole surface of the carbon to be in there working. The usual method utilised is to run the loco fairly gently for a considerable length of time. I personally do not like this because it is a protracted business and if there is anything binding elsewhere, the blame is usually laid at the wrong door step. My favourite method of bedding down carbons, is to obtain a round slipstone of approximately the same diameter as the commutator. The next step is to very gently dress down the carbon, attempting to give it the same contours as the commutator at the contact point. The idea is to remove a little at a time, so that inaccuracies can be rectified. Frequently replace the brush in its mount, under spring tension, and repeat the process until you have a snug fit between the two components. Should you not be able to obtain a slipstone of the correct size, it is possible to effect this simple surgery with a small half round file, but it must be of very fine cut. I must stress that you perform this job very gently and with attention to detail, otherwise the brush could be ruined. If you find that the moment you touch the carbon it breaks away from the brush body, don't swear, it is probably a blessing in disguise. The method of attaching the carbon to the brush body is to coat the carbon with a thin layer of copper, this in turn allows the carbon to be soldered to the brush. As happens occasionally, the company turns out a faulty one, it is better to have this happen in your hand, rather than in the motor where it will certainly destroy the commutator. You might argue that fooling with the brushes is not for you; my answer to this is, go down to your model supplier and buy a spare pack of brushes and practice the art. When dressing the carbon, make sure there is no pressure on the slipstone or file; let the weight of the tool do the cutting, work slowly and smoothly, and you might just surprise yourself. If you find that you are too hamfisted, you haven't lost a fortune and you my friend, will have to go back to the other method.

The next item in our check is the main bearings, usually these are fabricated from bronze or brass; if they are of the former, they are usually porous, with a felt oil retaining ring placed around the outside. These, if made and aligned properly, are excellent. I will deal with this type first as the other type have a separate set of possible defects and this could lead to confusion.

I will take the Triang Hornby X04 bearings as a typical example. In this motor the bearings are acorn shaped, held in place by a spring steel retainer, and brother, this is where our problems arise. The first job is to see if the armature runs smoothly in the bearings when they are absolutely dry; this will mean stripping the motor completely, but what the heck, you're in it up to your neck now anyway. After the first check, try the bearings again, this time with your favourite lubricant.

You will probably get a terrific shock at the bearing you have induced by using the very agent with which you hoped to overcome this. A point I should raise now is that a lot of lubricants that are supposed not to be flung off the components because of their ability to stick like glue to a blanket, are just the babies to induce drag, so please watch for this. I generally use a little silicone oil as I find drag to be minimal. Sure you have to lube more often that way, but I feel the improvement in running to be worth all the trouble. At this point, if you really want to get classy, there is a humdinger of a method to reduce bearing drag, and a good tip I learned of a long time ago, and this can be worked with brass or bronze bearings. Firstly, with the felt retainer type, you drill the bearing out, slightly over-size, flux the inside surface with a killed acid type flux, then tin the surface with good quality solder (not the cored type, remember, you have already fluxed the unit).

The next stage is to drill through the outside wall of the bearing with a 1/16" drill bit. This meets the future bearing surface at 90°, now you go just a little further so that you have a miniature oil reservoir in the opposite bearing face; now you drill or ream out your bearing until you have a good slide fit, with no interference at all; clean off any solder on the outside of the bearing, wash the bearing well; lastly, check that your new oil channel is clear of any debris, and voila, the most beautiful friction free bearing you could ever hope for. Repeat for rear bearing and you are all set.

Incidentally, if you wonder why the oil channel, remember that with the new lead thin wall bearing, the unit ceases to be porous. If you have a clapped out Ks Mk 1 or Mk 2 motor, this treatment will probably bring back its lost performance. This time though, you obviously not be able to drill an oil channel. The answer to this problem is to cut a couple of felt oil retainers and fit them to the shaft before assembly. By the way, with this type of motor, where you have to take the pole pieces off the magnets, you will most probably have to remagnetise the motor, to regain its performance and to stop undue overheating.

Well, after that digression, nose back on the grinding wheel. We were to where you discovered that your standard bearing might not be all it is cracked up to be. If you don't fancy all the work of making lead bearings, try working the shaft through the bearing with a little metal polish. Hold the shaft in your hand, place the bearing on the shaft, then revolve the bearing up and down the index finger of your other hand, utilising a little pressure, so that the shaft imparts a side load on the bearing. Move it up and down your finger a couple of dozen times. The next job is to clean out all traces of metal polish. If you don't do a good job here, you will have a wee spot of trouble later on (clapped out bearings, brother). Now lubricate with a fine oil and you should be able to detect a small improvement. If not, repeat the process. Please do not be like a buddy of mine in England who got so pleased with the improvement that he kept going until the bearing finished up a rattling fit and had to be thrown away. One last word about the main bearings of your motor, if it is of the plain bearing type, don't get lured into converting it to ball races. The very few motors on the market with ball bearing mains have very efficient dust covers fitted, which save you a lot of grief. Undoubtedly this type of bearing is better initially, but when they get a few miles in with no dust cover, they will end up with all kinds of icky goo in them, and are a perfect pest. Trying to keep them clean is guaranteed to drive a poor long suffering guy completely bananas. Believe me fellows, I know, because I walked into that trap with my mouth wide open. It got to the stage where I was swearing at the wife, taking kicks at the dog, and my infant son ran away and hid. If you think that's it for bearings, boy, you are mistaken.

I have kept the biggest villain for the last, in the bearing department. In a motor of the X04 type, there is another type of bearing. This is the cookie that causes a loco to go faster one way than the other. One lies between the main bearing and the worm drive, and therefore does the thrust bearing duties. Where a motor is situated behind the worm and wheel drive, the loco will run faster in reverse than in the forward direction. If the motor lies in front of the worm and wheel, the whole situation is backside about face, and the loco runs forward more efficiently. The reason for all this is that when the motor is set in motion in a forward direction (motor behind worm and wheel), the worm climbs up the wheel until it encounters the thrust bearing. This obviously increases friction right when you don't need it (the heavier the load, the worse it gets). Only after coming in contact with the thrust bearing does the worm impart any driving force to the wheel.

At this point I should explain that small parts such as the thrust bearing and the worm, are produced in their thousands on a capstan lathe. When the parting tool is in good condition, the mating faces of the two units might be quite acceptable for our purposes, a dull tool obviously would chew the units off the bar stock in a most untidy manner, with all the attendant problems that I have previously described.

There is another thrust face, lying between the acorn bearing and the commutator. This one does not seem to be subject to the same faults (I should investigate that further). I will make a few suggestions with regard to the solution to this problem in a later article, as this is one of the last items to be dealt with when reassembling the motor.

If I haven't covered all types of motor bearings, I apologise, but if you take the trouble to fit them, using the methods described, you shouldn't have any problems. People who have brass bearings in their motors might find them a trifle sticky at first, but a little attention could make them superb.

Well, thanks for getting this far guys, I hope I haven't caused too much confusion amongst the less technically minded. Next time (Editor permitting) I will continue with trouble shooting and more tips. If you, or the motor manufacturers get wild at me for my criticisms, I fully understand the problems of manufacture, escalating costs, etc. If the poor old manufacturers had to hand fit a motor, in the manner I have described, it would probably cost five times its weight in platinum, and we would not be able to afford them. Generally speaking, and taking into consideration how inexpensive our motors are, we get a pretty good deal.

****

MODULAR RAILWAY MODELLING: PART 2

By Paul E Ingraham

BENCHWORK

Specifying module size and shape is unnecessary. As Mr Freezer also notes '...rigid standardisation applied to baseboards (benchwork) is counter-productive. For a start, individual's locations vary so much that no one set of sizes can meet all needs. Then, more important, neither nature herself or a railroad, repeats itself at regular intervals. The baseboard should always be subordinate to the trackwork and scenery.'

There are, however, some practical considerations to keep in mind when deciding just what size a given module should be.

TRANSPORTATION AND STORAGE

Modules are meant to be easily transportable units. This means each unit should be of such dimensions and weight that the modeller can move it, set it up and take it down himself. It should also fit through doorways, up stairs, into elevators, and into small cars, the most common means of transporting modules. Through long experience it has been found that a length between 750 mm (30") and 1050 mm (41") is an optimum size. This size can be easily handled, turned over for wiring and for fitting into the back seat of a sedan.

A maximum width of 750 mm (30") has also been found to be about the practical limit for reaching across by the average sized modeller.

In some cases, particularly in the larger scales, such dimensions may not be adequate for a proposed scene. The answer here is NOT to build a bigger module, but instead to build a diorama of two or more modular sections, each of manageable size. In use the diorama functions as a single module.

The only benchwork dimension that must be specified is height. What that height should be will be determined by the use to which the modules are to be put. Generally this falls into one or both of the categories of display or operations.

For public display there may be children in attendance. If the display is intended to appeal to them, the table height should be low. Also if the system uses backdrop boards, the table height must be low enough to permit operators standing behind the backdrop to see over it and to reach equipment. There seems to be rather general agreement here that the height, floor to railhead, should be about 1 meter (39") with an adjustment of ±25 mm (1"). A note here: In order to allow for difference in module surface thickness, rail code, tie height, etc, the height should ALWAYS be specified from floor to RAILHEAD, not to the module benchwork surface.

For operations and set-ups where children are not a factor, many prefer a higher table in the range from 1100 mm (43") to 1250 mm (49"). A good compromise might be 1150 mm (45¼"). This allows most adult operators to view trains at nearer eye level, but it is not so high that a short fellow has to stand on his toes to see. A higher table height also makes it easier to work under the table - a real help during set-ups.

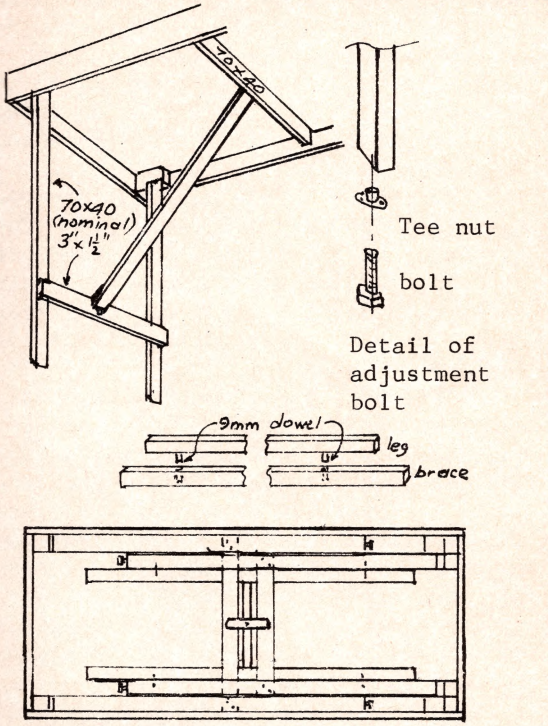
It is possible to design modules which can be used in both display (low) or operations (high) positions. Alternate leg sets can be substituted or sliding adjustable types used.

Support for modules requires some thought. Unlike a permanent layout in which the legs can become part of the structure, legs for modules have to consider flexibility of arrangement, height adjustment and set-up time. It is important that each module be able to stand independently. This makes it possible to set it up at any time, anywhere, independently of other modules for work or operations. It can also be put into any part of a layout, and the chances of accidents when setting up the layout or taking it down are greatly reduced.

Seldom, if ever, will the floor of the layout area be perfectly level. Also rare is the chance that all modules will have been built to close enough tolerances that heights will match precisely. For these reasons it is important that a method of adjustment be incorporated into the legs. In most cases a bolt and tee nut in the end of the leg, permitting adjustment of ±25 mm (1") from the specified height will be adequate. Providing sliding or telescopic legs will permit changes in height sufficient to use the modules in both high and low positions.

The question of set-up time is important where a session is short, as at one day meets or Club operating sessions. The type of leg system selected can greatly influence this. The fastest is a completely self-contained folding leg set such as the one shown in Figure 7. It requires no tools for assembly and can be mounted with commercially available brackets or wooden hand-cut supports. Properly braced it is as strong as any other type.

Bolt-on legs are also sturdy, but require a wrench or screwdriver to attach. This means there are loose parts to keep track of, tools to carry and somewhat longer set-up times. The important thing is that the leg system provide rigid, independent support for each module.



legs folded for transport

Figure 7
Self-storing module leg system
brace storage

Let's look at module framework construction. Modules require the most strength and rigidity possible with the least weight. This means relying more upon engineering than sheer mass of materials. It is also another reason for limiting the size of modules because the forces which tend to act on them - torsion and racking - are greatly reduced in shorter lengths. While nearly any common layout construction method can be adapted to modules, L-girder construction does not work as well as some other methods because the weight per unit area is too great. Racking can be a very real problem in long modules.

The simplest method is diaphragm

construction - a perimeter frame with a solid top. Additional crossbracing can be used where necessary to support large areas. With this method it is also possible to reduce weight by using lightweight materials. The frame and legs can be made of pine or redwood instead of fir. Thin aircraft plywood has also been used successfully. The surface can be foamboard instead of plywood. The use of such materials will cut weight to 1/3 or 1/2 - even less - with no loss in structural integrity.

Finally, the method of joining the modules together needs to be considered. Undoubtedly the most secure is through bolting with carriage bolts and wing nuts. Carefully done, both lateral and vertical alignment are achieved instantly. However, the real problem is accuracy and the job practically requires the use of a jig. This can be a logistical problem if the system is used internationally.

Another problem is that, if the modules are to retain reversibility, the bolt holes would need to come precisely under the centre line of each through track. More than one track means more than one hole and the chance for error is thereby increased.

A more versatile - and very widely and successfully used - system is the C clamp. In this, the area of the framing under the track at interfaces is kept clear to accept the clamp faces. After vertical alignment has been achieved by adjusting the leg bolts, the modules are simply slid into alignment laterally and the clamps tightened. There is no need for jigs or holes. Tracks can be aligned in any arrangement, modules reversed and modules from different systems interfaced easily.

TRACKWORK

Trackwork considerations for modules are generally the same as for a permanent layout. Special attention to the components at interfaces are the only additional points to consider.

As on all model railways, quality of trackwork is important. For modules this is especially true for the through tracks which cross the interfaces. Track must be in gauge, smooth, with no kinks and accessible for cleaning and maintenance. These considerations should be noted in the specifications.

Where appropriate NMRA or other trackwork standards cannot be adopted, the standards to be followed must be clearly spelled out. Once the standards are defined, there is no further need to limit types of track to be used. Hand laid or commercial products can be used and will provide greater variety and interest.

However, from experience, the universal adoption of nickle silver rail is recommended.

The question of curves, minimum radii and turnout size needs to be considered. These should be based upon the types of equipment to be run. The NMRA RP11 figures for curvature and rolling stock classes can serve as a guide here. Generally it seems advisable to be able to accommodate all types of equipment on the mainline. This means that clearances, minimum radii, turnout number and rail code should be specified with this in mind. NMRA has clearance figures for all scales down to TT. N scale figures have been proposed and are in use on the major N scale modular systems, where, in fact, they originated.

The problem of carrying the track across the module interfaces is unique to modular construction. The important points are that the join be smooth, reliable and not vulnerable to damage. Running the rail right up to the ends of the module makes it susceptable to damage when the module is moved. Another problem is that of thermal expansion in warm weather. A far greater degree of accuracy is required in cutting the rail length and the accuracy required at multi track interfaces really demands use of a jig. Finally, such a system cannot accommodate the use of different rail codes on adjoining modules.

By using a drop-in section, the rails can be set back from the ends far enough to protect them from damage. The rail length can err a bit because there are two joints at which to make up the discrepancy. If rails are too long, the connector track can be trimmed, thereby saving some hard feelings and the chance of damaging track on the module.

On multiple track interfaces, the side play of the connector tracks allows compensation for differing centre line spacing to some degree. And a connector track can be spliced together from different types of rail to permit interfacing modules with different rail sizes. About half the systems examined have chosen the drop-in connector track system. There is some difference in the lengths chosen. By test it has been found that, to avoid kinks and compensate for all but the most extreme alignment problems, the section should be at least 125 mm (5") in length. There are readily available sections of track available near this dimension and these have been adopted by many systems. Some 0 scale systems have had good results with rail-only sections spiked in place to hand-laid connector track bases, though these do take longer to install.

One exception to the connector track idea is Lionel and other systems where tubular track sections are used. Here the sheer size of the rail minimises damage and carrying the rail to the end of the table is the only practical method.

The last question concerns the number of through tracks there should be, and where they should be located. These questions are intimately connected with the purposes of the system and the aesthetic and practical considerations discussed earlier. But there are some points worth considering.

Prototypically, most railways use single or double track mainline. This is sufficient for most operation patterns. More than two tracks across a module take away valuable space and make the module look crowded and cluttered. Visually, more parallel tracks decrease the illusion of length, something always greatly sought on a model railway.

If more than one through track is used, the centre line spacing needs to be specified. Again, NMRA data can be followed, and there is general agreement here: 100 mm (4") for 0 scale, 50 mm (2") for HO. In N it has been found that even the largest equipment will pass at 30 mm (1.2") centres and this is recommended.

The location of track interfaces at the module ends need not be specified. The only thing that such a specification ensures is that one side of the benchwork will form a straight line. While this may look nice at a public show, it lends a rather rigid and static look to the track patterns as well as limiting creative and operational possibilities.

The only limitation that should be placed on track location is a practical one - a protective margin in from the side. The maximum height of the clearance gauge for the scale modelled is normally sufficient for this.

While it is possible to cross interfaces at any angle, the easiest is 90°. If all interfaces are standardised at 90°, any module - any through track on any module - can interface with any other through track on any other module.

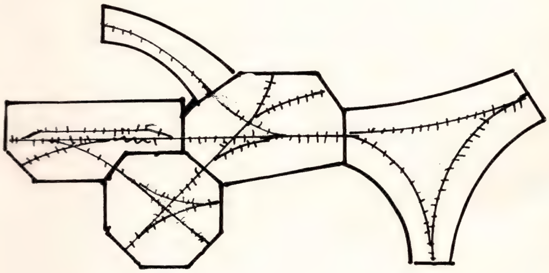


Figure 8

As we have seen in various examples, this need not limit the number of interfaces. No matter what the track plan is, simply provide a 90° interface in the benchwork and trackwork. Then any module can be connected to it. The rather creative examples in figure 8 - some of which actually exist - demonstrate the point.

Having the possibility of reversing modules, junctions, multiple or single track, crossings and other types of modules all adds to the usefulness, interest and versatility of the system.

GRAND PERFORMANCE OF THE 44

By Bill Hughes

Some time ago there appeared in one of the Australian Model Railway Magazines an article on the Lima 44 class and its hauling power. The article suggested that the 44 class, as purchased, was only good for hauling six coaches. The reading of this article left me quite perplexed because, you see, at that time my 44s were hauling 10 coaches regularly up 1 in 50 grades. At one stage, two of them hauled 24 coaches up the same grade. The locos of this 24-coach train were just coming off the grade as the last coach started to ascend.

The only modification to the locos was the fitting of Kadee couplers which, of course, could not be expected to effect the hauling capacity. The coaches were Lima Indian Pacific stock. The only modification being the fitting of Kadee couplers.

Other members of the Gladstone Model Railway Club who read the article and witnessed the performance of my 44s were full of suggestions as to why the writer of that article came to the conclusion he did about the 44s. 'Perhaps he forgot to release his brakes before starting out.' 'The rails must have been greasy and the sand was not working.' 'Did someone leave a hand brake applied?' 'The coaches he used must have been those old Hornby tinplate ones. You know - those ones that run as though the brakes were permanently set.'

The abovementioned Hornby coaches could be placed on that 1 in 50 gradient and the loco uncoupled without fear of them running away. Not so with Lima Indian Pacific coaches. This brings to mind an incident in which, due to a track defect, 10 Indian Pacific coaches became uncoupled from the 44 and went careering back down the 1 in 50 grade, picking up speed at an alarming rate. They were travelling so fast that it was feared they could not possibly make the 3' radius curve at the bottom of the bank. Miraculously the run-away did make that curve and went sailing, out of control, into the station, only coming to a stand after the effect of the grade slowly wore off.

These Indian Pacific coaches are so free running that if one is placed on a section of track which appears level, but isn't, the coaches will run down until they find the lowest point. If a light breeze is blowing, the coaches will not remain stationary, but will be blown along with it.

Question How does one get a model coach to run so well? Easy. Just a little graphite on the bearings. I used powdered graphite. But be warned. They don't call graphite grease lightning for nothing. If it gets on the wheels it will be transferred to the track and from there to the loco wheels. Your prize loco will be flat out pulling itself around, let alone a train if it gets graphite on its wheels.

The best method of applying graphite is to first remove the wheels by gently spreading the bogie side frames using the fingers and easing the axles out of their bearings one at a time. Then, using a lint free cloth, thoroughly clean the bearing surfaces. That is, both the needle point on the end of the axle and the hole in which it normally rests. You will need a pointed instrument to wrap the cloth around if the axle hole is to be properly cleaned (pencil will do). Now take an ordinary lead pencil. That's right, an ordinary lead pencil. The lead in the pencil is a composite of graphite. The pencil should be at least sharp enough to reach the smallest part of the axle hole. Work the pencil around in the hole using circular motions so as to deposit graphite on the total surface area of the hole. Do each axle hole in like manner. Then using the pencil, deposit a thin layer of graphite on the needle part of the axles. Next slip the axles back into their normal position using the same method that was used to remove them.

Check that all axles are properly located and that the wheels are running free. Place the coach on the track. You should now be able to see the difference this type of lubrication makes. Go on. Give that coach a gentle push. See how freely it rolls. Use graphite as a lubricant on all your rolling stock. It makes all the difference. It is, however, a conductor of electricity. So be careful not to get it across wheel insulators.

With these few parting words I will leave you to your own modelling and wish you all good and happy modelling. Remember, a hobby is supposed to be fun. When it ceases to be fun, then something is seriously wrong. So try to enjoy your hobby to the best of your ability.

* * *

ROUTE SELECTION USING DIODES AND RELAYS

By Bruce Norton

Route selection is a system of wiring point machines and control to provide the required movement of trains through a system with a minimum amount of operator action.

Many modellers are aware of using diodes to provide for route selection, and articles have been written in magazines and books regarding their use. (ref 1)

To demonstrate the use of diodes, let us assume we have the track layout illustrated in Figure 1, and we wish to have one button on each of the roads in the yard to select the route for that road.

Start by labelling all the various parts and components in the system. Label the three-way point P1, and the right hand point P2. It is obvious that P1 will consist of two point motors PM1.1 and PM1.2. For P2 the point motor is labelled PM2. Let the routes to be selected be known as A, B, C and D. One further consideration is that of designating the direction of the points as they are set by the point motors. I consider that when the

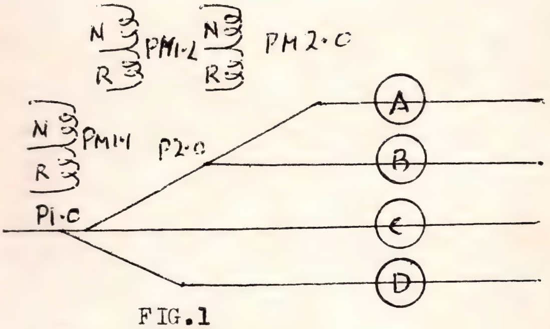


FIG.1

Track schematic for example of route selection by Diodes blades are set for the straight route they are 'normal' (N), and when diverging 'reverse' (R).

We can now set out a table which will diagrammatically illustrate the necessary arrangement of diodes and connections to give correct operation of the system. Such a table is called a logic listing, truth table, or a matrix table.

Firstly list in a column on the left of the page, the desired routes (A, B, C and D). Then across the top of the page the point machines (PM1.1, PM1.2, and PM2.0) in a row. Divide each point machine column into two columns headed N and R.

To fill in the table, we ask ourselves what we want to happen when we push the button for route A. Looking at the track diagram, we can see that we require PM1.1 to be N, PM1.2 to be R, and PM2 to be N. On the matrix table we draw diagonals from the row A to column PM1.1 N, PM1.2 R and PM2 N (it is assumed that the three-way point requires the right hand section to be normal before the left hand section can be made reverse and vice versa). With similar reasoning (logic), the matrix table can be completed for the other routes (see Fig 2). You will notice that for routes C and D, no diagonal is drawn for PM2. This is because PM2 has no effect on routes C or D.

	PM1.1		PM1.2		PM2.0	
ROUTE	N	R	N	R	N	R
A	/			/	/	
B	/			/		/
C	/		/			
D		/	/			

FIG. 2

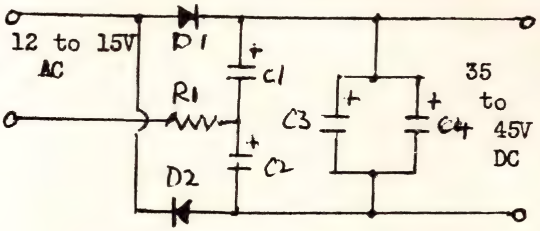
Matrix Table or Logie Listing for Track Schematic in FIG'1.

The next step is to look down the columns under the point motors and take, for example, PM1.1 N and you will notice that there are three diagonals from the route selection rows A, B and C. This means that for routes A, B and C, PM1.1 N is required to be energised. Looking at PM1.1 R, it is seen that only in one instance is it required to be energised; that being for route D. Insert in any column with more than one diagonal, a diode in all those diagonals. Leave columns with one diagonal only as direct connections between the route selection row and point motor column.

Connect A, B, C and D rows through momentary make push buttons to the positive side of a d.c. power supply, preferably of the capacitor discharge type.

“OOMPH Capacitator Discharge power Pack.

Reprinted from Journal 56, May 1965



D1 & D2	18A Diode (Phillips BYY 20)
B1	half of Electric jug element
C1 to C4	500 mF 40 VP condensor.

Diodes used for most applications should be rated at 100 V, 3 A, or greater.

Figure 3 illustrates the resulting diode matrix and connections.

The advantages of using diodes are:

1 High reliability
2 Low cost
3 Easy to connect, modify and reuse
4 Small space required

With all these advantages, why should one be interested in applying relays to this application?

Well, there are several good reasons to use relays in some instances. In my case relays had the following advantages:

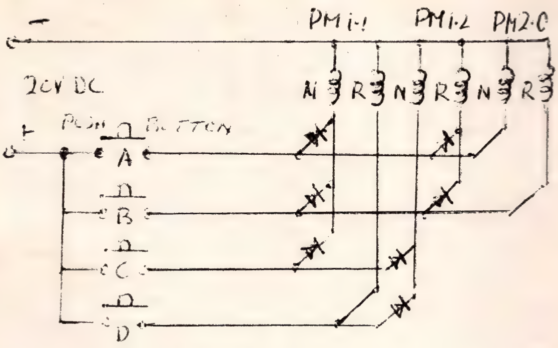


FIG. 3

Translation of Matrix Table into Actual Connection Diagram

1. Were low cost ex surplus
2. Were of a miniature type
3. Had a large number of contacts
4. Had a low operating current

These relays measured 35 mm deep, 35 mm high and 20 mm wide. They were designed for plug in service, but connections were soldered directly to the pins. Current consumption at rated 24 V d.c. is approximately 50 mA. Unusual among relays in general is the large number of contacts, six of the changeover type. The schematic and connection diagram for this relay is shown in Figure 4.

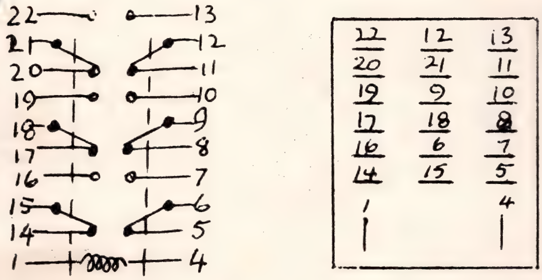


FIG. 4

Relay Schematic and Connection Diagram.

Looking back at Figure 1, but this time with the use of relays in mind Fig 2 still applies, but to obtain a diagram equivalent to Fig 3, we apply a different method of connecting the power supply to the point motor coils.

Instead of connecting diodes in the columns which have more than one diagonal, we insert a normally open contact in all the diagonals.

For simplification in drawing the diagram I use the contact symbols used by signal engineers to denote normally open or normally closed contacts. Fig 5 illustrates how these symbols are drawn and their general electrical schematic representation. It is quite apparent how much simpler it is to use these symbols. To recognise the particular contacts in the diagram, they are numbered as they appear on the relay base, i.e. according to Fig 4.

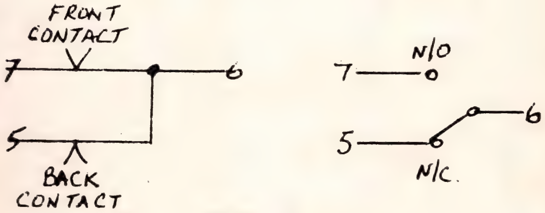
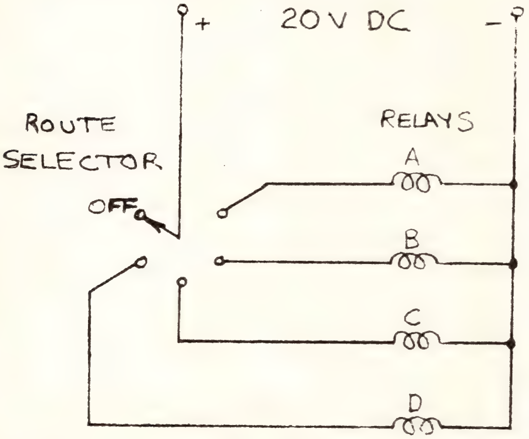


FIG. 5

Simple method of illustrating relay contact arrangement. Front contact means contact is made when relay is energised and is equivalent to a N/O contact. Back contact means contact is made when relay is de-energised and is equivalent to a N/C contact.

Instead of Fig 3 we have Fig 6. You will notice several differences other than just contacts replacing diodes. Firstly, these particular relay contacts are not designed to handle the switching current drawn by point motors. In this circuit, the relay contacts are made before point power is applied. This means that a particular route is selected, and then set by operating a momentary make push button. The contacts are made as long as the relay is powered, i.e. a particular route is selected. Although this may appear to be a shortcoming, it allows track power to be switched to the track or section selected.



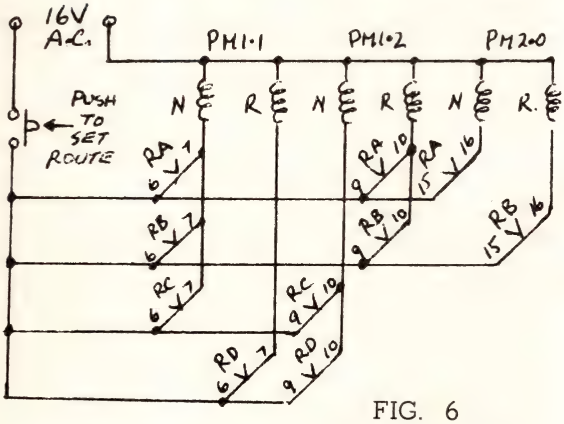


FIG. 6
Matrix Table and Connection Schematic for Track Layout in FIG. 1.

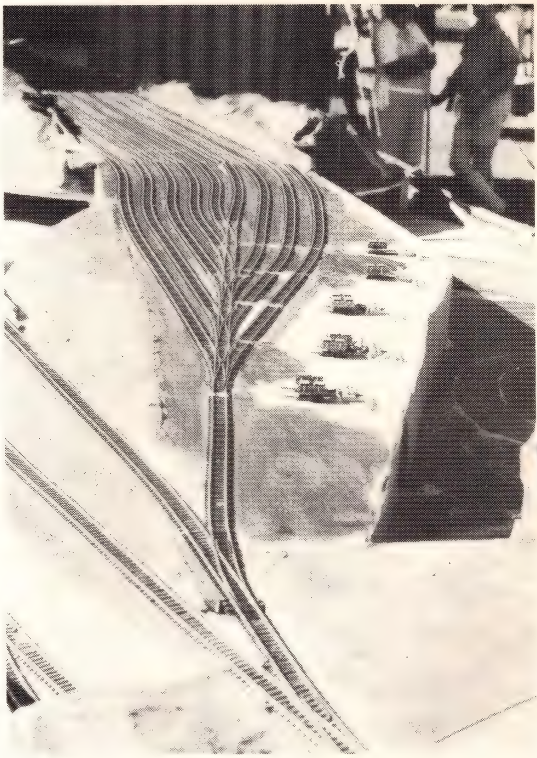


FIG. 7 [illegible] e Yard.

The rotary switch is unusual but easy to use, low in cost and compact because it is used to switch power to the relay coils only. For low current consumption relays, the switch also has a long service free life. Heavy currents are passed through the momentary make push button, but since a.c. is used, and the

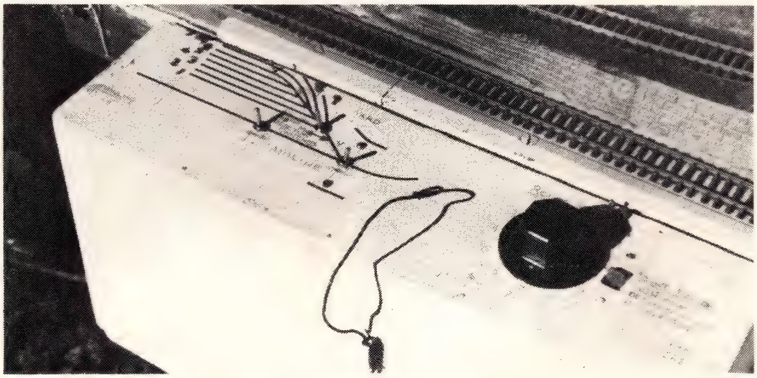


FIG. 8.
Control Panel for Operating the Yard

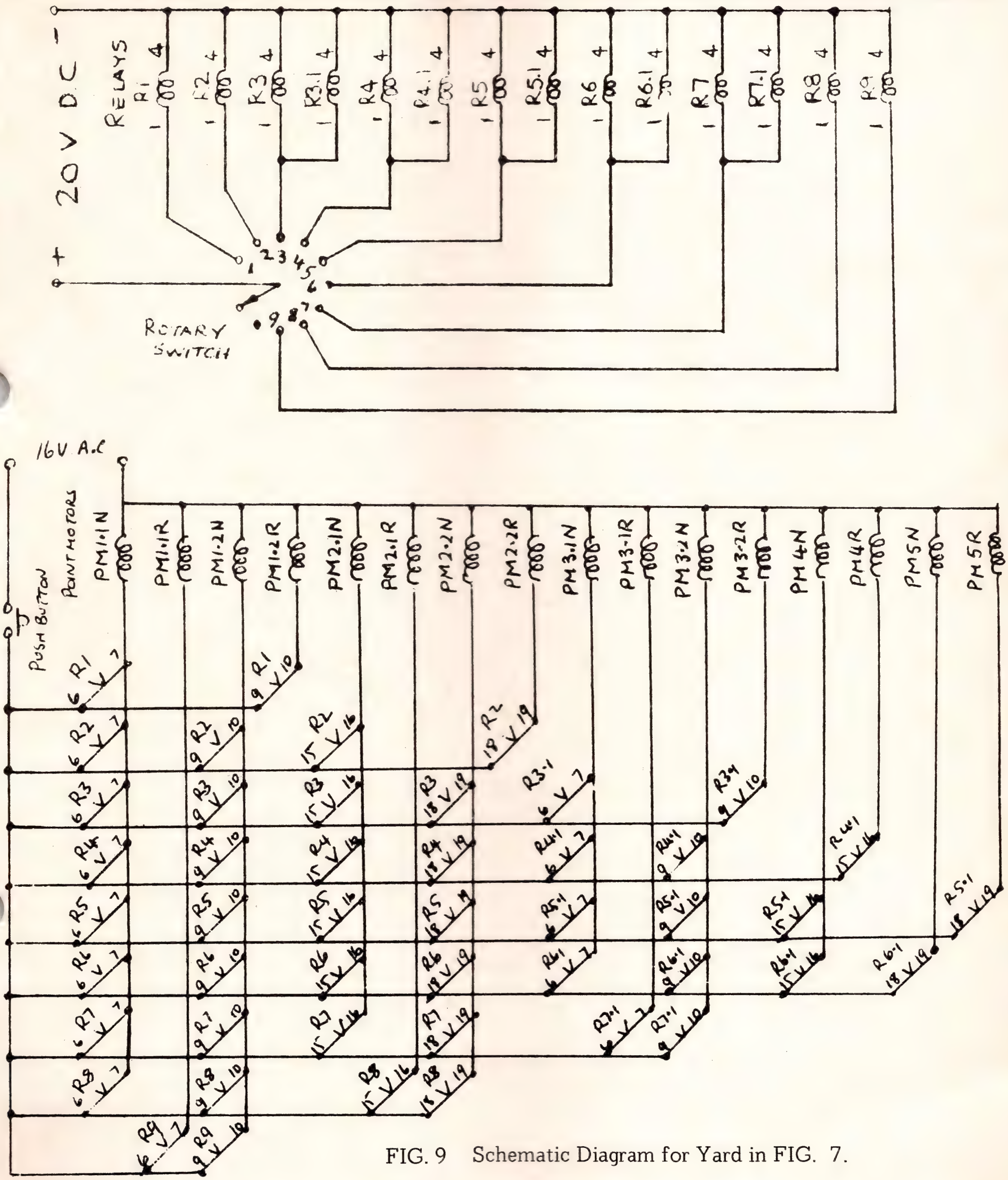


FIG. 9 Schematic Diagram for Yard in FIG. 7.

switch is rated 110 V, 6 A at least, it will have a long life. In comparison, the switch required for the diode method is required to be of a heavier duty or suffer from shorter life due to the more severe nature of the d.c. current switching.

More usual on/off switches could be

used in place of the rotary switch, but their use requires that a previously selected route be switched off before a new route is selected and the points set.

Relay route selection is currently in use on a friend's layout. On this layout I had a free hand in setting up a nine-track yard using only the points left over after completing the main line. My objective was to install a system which was as economical as possible, yet impose no operating restrictions.

Photographs, Figs 7 and 8, illustrate the yard and the control panel for the yard, respectively.

Operation of the yard is as simple as sleecting either the mainline or local controller to run the yard; turn the rotary switch to the desired route, and push the momentary switch. The route is set and the section switched to the controller selected, allowing the movement to or from the mainline to be completed.

No faults appeared during three days of operation at an outdoor local festival, and the system proved very easy to use, even by newcomers.

The matrix table for this particular track layout is illustrated in Fig 9. An actual wiring schematic diagram for one of the three-way points is shown in Fig 10. This style of diagram would be especially useful if fault finding is required, as it only shows the wiring and contacts associated with the selection of a particular point motor coil.

You may notice from Figs 9 and 10 that there is a set pattern for contact use. This pattern allows for easy wiring, and later for easy fault tracing.

Contacts 21 and 22, on relays R1 to R9, are used to provide power to the

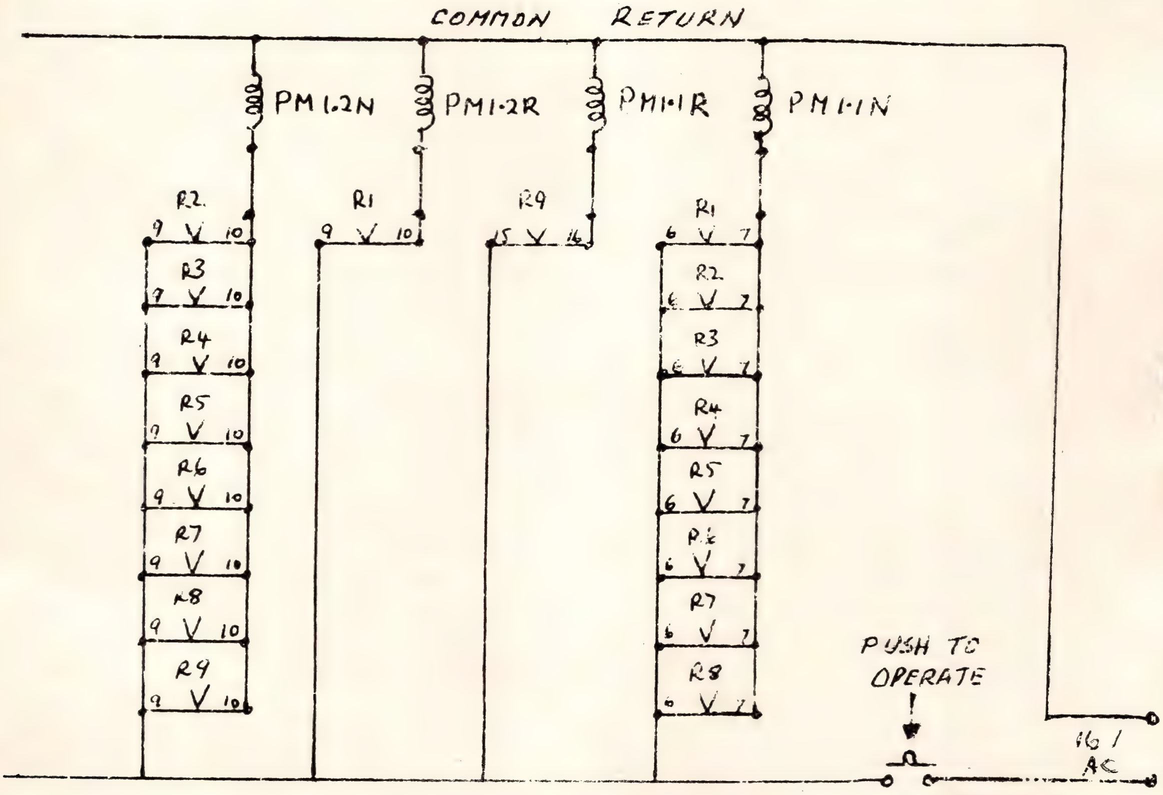


FIG 10. Schematic Diagram for the first three way point in the yard.

track selected. Although a common return was used for the track circuits, contacts 12 and 13 could also have been used for cab control switching.

Look at your own track layouts and consider the advantages and simplification in operation that route selection offers. Any one with problems with either of these systems, should write to the Editor of Journal. Through the pages of Journal, these problems, as they arise, may be overcome for the benefit of all interested modellers.

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References

1 'Practical Electronic Projects for Model Railroaders', by P J Thorne Published by Kalmbach Books 1975, pages 37, 38 and 39

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A.M.R.A.

1979 MODELLING COMPETITION

JUDGE : BILL COOPER

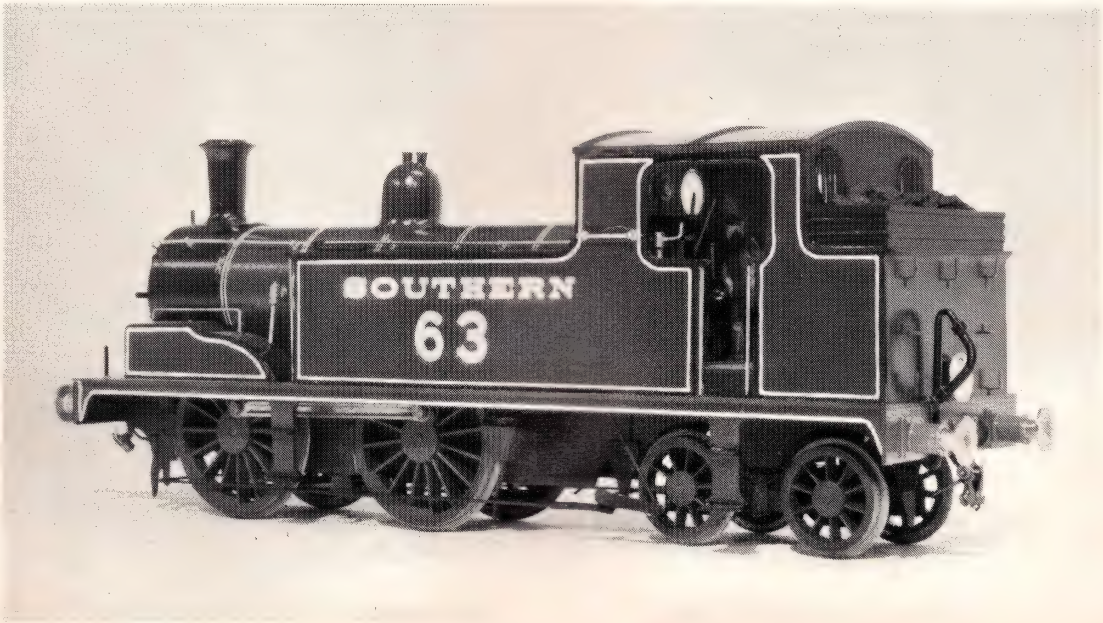
Entries were down a little in number this year, but not in quality. Models in the traditional materials - wood, sheetmetal and cast metal - were in evidence, although outnumbered by that excellent material - sheet styrene - which, as mentioned last year, produces results indistinguishable from metal in shorter time.

TIM DUNLOP CUP

For Scratch Built Locomotives

Once again the choice of top model in this class was difficult - there being accurate, beautifully detailed and finished models to choose from. After much cogitation, the following judgement was made:

FIRST SR (ex LSWR) T1 Class 0-4-4T
7 mm scale
by Phillip Knife



This superb model of one of an Adams (hence beautifully proportional) tank loco, and is of composite construction, metal chassis, basic boiler and accessories, around an 0.030" styrene body, which is strong and straight. Attention to detail is astounding and includes full brake gear, cab detail, lamp irons - even apropriate head codes (on both ends, perhaps correct for short runs). The finish also is excellent, although the decal film is perhaps a little intrusive, being best trimmed a little closer to the letters and numbers. Ah O Gauge: If only it did not consume so much space.

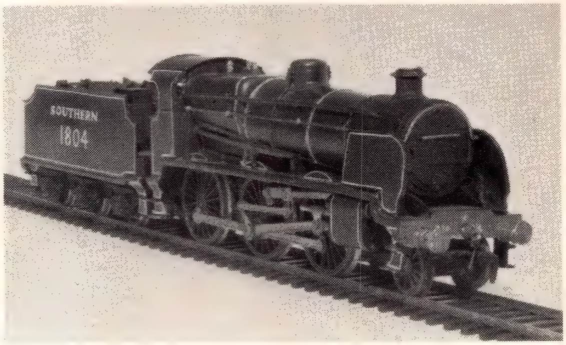
SECOND SR (ex LSWR) T9 Class 4-4-0, 4 mm scale
by Peter Betts

Yet another exquisite model of an exquisite prototype. This time in sheetmetal. Well engineered and superbly finished, with extremely neat hand lining and lettering - the T9 runs as well as it looks. A neat touch is the tonal difference between the prototypically glossy paint work of the boiler cladding, cab and splashers and the matt finish of the smokebox, funnel and front apron. Smokebox door details include dogs to keep pressure where it belongs. The equally excellent tender (note those coal rails in the photo) rests some of its weight on the loco, thereby overcoming some of the unsteadiness of model 4-4-0s. In all, a beautiful model, just beaten out of first place.

FEDERAL CUP

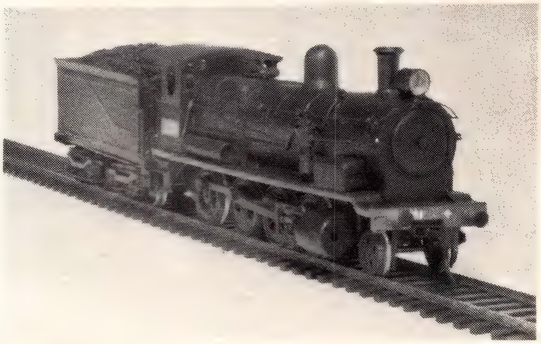
For Kit Based Locomotives

Intelligent adaption of a ready to run or kit model to either more closely resemble the prototype, or to look like something quite different, is a very satisfactory modelling technique, assisted today by the high standards of over the counter items. The examples in this class illustrate the point, and include white metal and styrene bodies on commercial chassis, and a rebuilt plastic diesel.



FIRST SR Class U, 2-6-0, 4 mm scale
by Peter Betts

This neat rebuilt model represents a tender rebuild of Maunsell's 2-6-4T, River Class, in disrepute for allegedly unsteady running. If the rebuilt prototype ran as well as this model, then it must be considered a successful conversion, for the Triang chassis with replacement wheels is a smooth performer. Although perhaps lacking the finesse of sheet built bodies, white metal kits can produce strong, well weighted and detailed motive power. Minor criticisms of this model include the heavy handrails and the unfilled seam down the boiler, but the general craftsmanship and the excellent finish more than offset these. The lining and lettering is especially excellent.



SECOND NSWGR TF (53), Class 2-8-0, 3.5 mm scale
by James McInerney

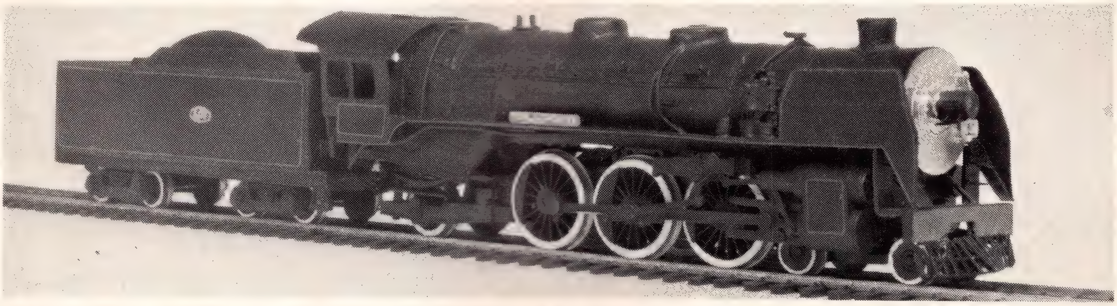
This familiar looking machine runs on a modified commercial chassis. The styrene body exhibits much fine, neat detailing, including lubricator lines. The scale size handrails and grab irons are particularly commendable. Funnel and dome are also of accurate proportions. In all, a very creditable model. How about a SMR 2-8-2T next year?

THIRD SAR 600 Class 4-6-2, 3.5 mm scale
by James McInerney

FOURTH NSWGR 40 Class Diesel, 3.5 mm scale
by Phillip Larmour

A neat conversion of a plastic diesel loco into the well known MLW (Alco) 57 killer. A well formed scratch built cab and battery boxes, thickish handrails, Cal-Scale five chime air horns and neatly made pilot equipped buffer beam, have produced a readily recognisable outline within the confines of the original model's dimensions.

Well done!



THIRD Kit Based Locomotive SAR 600 Class, 4-6-2 by James McInerney

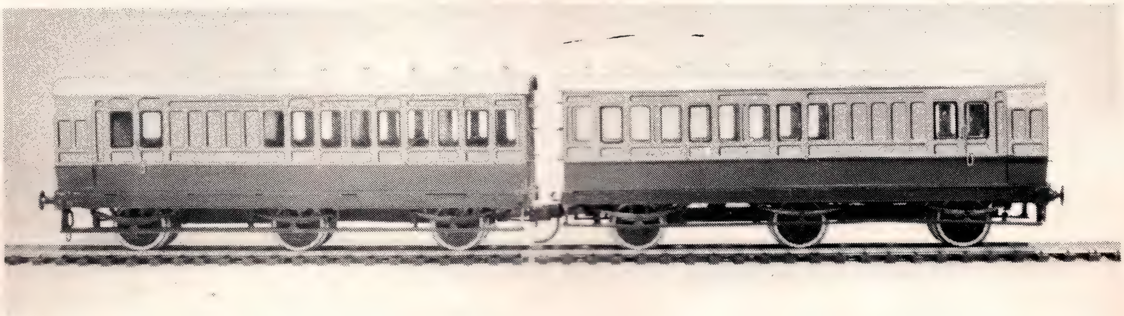
A handsome model of a handsome prototype. This model also is in styrene, running on a commercial USRA light Pacific chassis. It displays neat workmanship and attention to detail (those fine handrails again), and the only nitpicking comment concerns the thick white driver rims, admittedly it is very difficult to paint a half width drive tyre. An unusually realistic touch is the half empty tender bunker. Once again a neat workmanlike model - a fine effort.

NSW BRANCH CUP
For Scratch Built Rolling Stock

Only two entries in this section, but both were of high falibre.

FIRST LSWR 6 Wheel Brake/Third, 4 mm scale
by Peter Betts

A delightful model, built in nickel silver, after moulds had been made from the sections for epoxy casting. The general construction and detailing is superb, being true and square. The operating radial suspension is excellently engineered, and works well.



Which one is the kit? LSWR 6 Wheel Brake/Third by Peter Betts

Painting, lining and hand lettering is of similar standard.

SECOND NSWGR EHO Brake Van, 7 mm scale
by Norm Read

A lovely, solid, well built model in KING scale. Of traditional construction, metal underframe and wooden body - like the prototype, this van has the feel and mass of the real thing. Ah, if only one had the space!

VIC BRANCH TROPHY
For Kit Based Rolling Stock

FIRST LSWR 6 Wheel Brake/Third, 4 mm scale
by Peter Betts

Produced in epoxy resin from the master that gained first place in the Scratch Built Rolling Stock section, and built by the same craftsman, it is only to be expected that the same near perfection is achieved.

SECOND NSWGR OHG Van and Domestic Water Tank, 3.5 mm scale
by James McInerney

It was only after some thought that these excellent models were placed in this category (kit based), as much care and labour separates the finished products from their origin as epoxy kits.

Both models exhibit extensive scratch building and neat detailing. The van has a genuine paper roof, and those fine handrails are immensely satisfying. The scratch built tank is very good indeed, with exceptionally fine ladders. They show what can be achieved using local kits as a start.

CANDEMAH CUP
For Lineside Structures

One entry only, but what an entry!
LSWR Footbridge, 4 mm scale
by Peter Betts

It is difficult to imagine how this absolutely superb miniature could be improved. Fabricated entirely from brass sheet and wire, the general proportions and detailing are faultless. This is, without doubt, the best executed model structure what I have seen.

In conclusion, I would like to say now is the time to plan that model for next year's contests.

There is plenty of information in the model press, both local and overseas. If no plan exists, find an object, take plenty of photos, and eyeball the general dimensions. Above all, have a go. You may be surprised and certainly gratified with the results.

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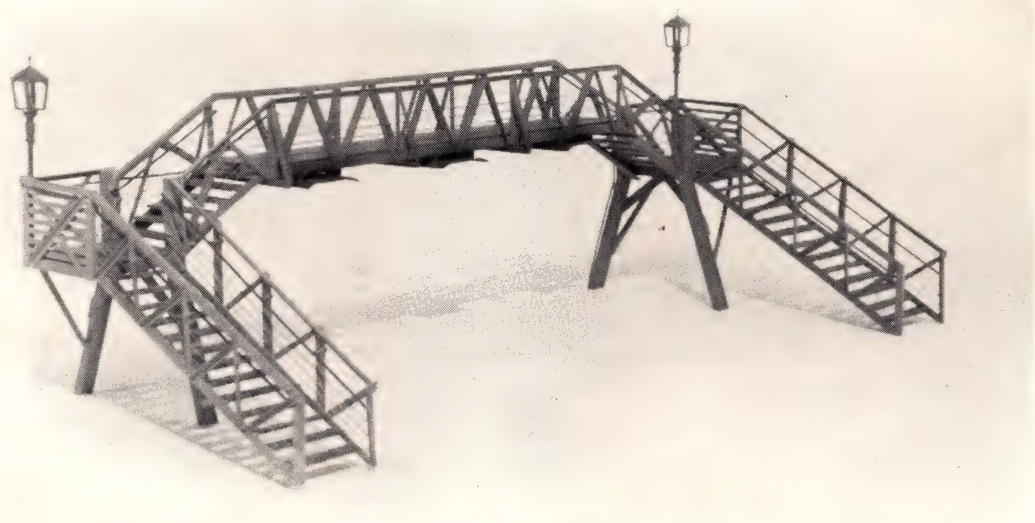

LINESIDE STRUCTURE LSWR Footbridge by Peter Betts

Some details of entries

TIM DUNLOP CUP

SR (ex LSWR) Adams T1 Class 0-4-4T
Built by Phillip A Knife

The Prototype

This class of 50 large 0-4-4 tanks was built by the London and South Western Railway, to the design of William Adams, in the years 1888-1896. Employed initially on London suburban services, they all eventually found their way to country branch lines after being displaced by the onslaught of electrification. The whole class passed into Southern Railway ownership in 1923 when the LSWR was absorbed in the Grouping of that year. Reliable, rather than brilliant, in service they continued to work hard until wholesale withdrawals commenced in the mid 30s. However, wartime locomotive shortages gave the remainder of the class a reprieve, the last one going in 1951.

The model represents No 63, one of the few members of the class to be rebuilt with a Drummond pattern boiler in place of the original Adams type. This locomotive is in the Maunsell lined green livery of the 1930s, and depicts No 63 as she was in Southern Railway days.

The Model

This model is built to the scale of 7 mm to 1 ft (1:43.5), British 0 gauge, with wheels to BRMSB fine scale standards. It operates on 12 V dc, two rail collection, and is powered by a 5 pole ring field motor salvaged from an Atlas turntable motorising kit, driving the rear wheels through adapted Romford 30:1 gear. The chassis is constructed from 1/16" brass strip, with frame spacers machined from brass on the Unimat, and a motor mounting plate filed up from 1/8" strip. Coupling rods are adapted from nickel silver bullhead rail and wheels are all CCW plastic-centred type with steel tyres. A special wheel quartering jig had to be built in order to fit these wheels - but this will come in handy for any future locomotive projects.

The body is constructed substantially from 0.030" styrene sheet, well braced to ensure a strong and rigid job. The boiler is built up around a heavy-gauge aluminium tube of the correct diameter, with chimney and dome turned up from solid brass on the Unimat. A Seuthe smoke unit is fitted inside the smoke box for extra realism when the model is running. Full cab detail is included, all scratch built, and full brake gear is fitted. Commercial sprung buffers of the correct pattern are fitted, together with working screw link couplings and vacuum pipes. Other commercial parts used, and not yet mentioned, are steps, whistle, sandboxes, brake shoes and loco crew.

Precision paints of the correct colours, applied by air brush, finish off the model. Lining is applied by hand and the whole model is sprayed with a gloss varnish to protect the surface. Transfers are by CCW, and are of the waterslide type. Real coal, crushed to size, is used in the bunker.

This loco has been built to work, and is not just a showcase model.

Reference: Roche Drawing S/L 111

TIM DUNLOP CUP

SR (ex LSWR) T9 Class 4-4-0
Built by Peter Betts

The model is entirely scratch built apart from wheels, gears and motor. The wheels are re-machined commercial items.

The prototype was built in 1899 and was Duggald Drummond's most successful locomotive. The T9s bore the brunt of mainline work until about 1925 when they were replaced by the King Arthurs. The class, which consisted of 66 locos, were eventually superheated, and all lasted well into the 1950s and a few into the last years of steam.

The model represents the loco in its original, non-superheated, form as it would have been running in the 1920s. This model was the first serious one ever built by this modeller some 20 years ago. However, since the original it has been twice re-modelled, and now all that remains of the original is the wheels, footplate and cab sides.

Fabrication is from brass and nickel silver, and the coupling rods are made from titanium. The latter was used since it has a better resemblance to slightly tarnished oily steel than does steel itself. An innovation of note is that the tender is fully articulated to the loco to give extra adhesion and stability. The tender is fully compensated in itself. The loco bogie is also fully compensated in itself, and sprung to the main chassis.

FEDERAL CUP - Loco Conversion

SR Class U, 2-6-0
Built By Peter Betts

The prototype was introduced in 1928 being a rebuild of the Maunsel River. Class 2-6-4 tank loco, which was introduced in 1917.

The model is built from a Wills white metal kit, on an adapted Triang Chassis.

NSWGR 53 Class, 2-8-0 Goods Locomotive
Built by James McInerney

The Prototype

The history of the NSWGR Standard Goods classes is well known, and so need not be repeated. 5346 was modelled because I wanted a standard boilered 53 with a 'Wampu' tender, that was around in the early 1950s. As I had seen a photo of 5346 so fitted, it was the logical choice.

The Model

Resting on a much modified Jouef French 2-8-0 frame, this model was constructed mainly from styrene, including a rolled styrene boiler. The wheels were turned down to scale dimensions, and the chimney and dome also turned by a friend. The tender is a CMJ casting.

Loco Conversion

SAR, 600 Class, Heavy Pacific
Built by James McInerney

The Prototype

No 609, 'Duke of Clouchester', was the tenth engine in the class of heavy express Pacifics which were introduced in the mid 1920s under the auspices of the famous Commissioner Webb. Their main purpose was the haulage of the 'Overland' between Tailem Bend and Servicetown, and they eventually came to handle virtually all traffic on this line. They also ran on the line to Terowie, and occasionally on the line to Port Pirie when that line opened in the 1930s. They were, unfortunately, the first class to be withdrawn on mass with the advent of diesels, and were all scrapped before the preservation movement grew strong enough to save one for posterity.

The Model

The model represents 609 as she was in the late 1940s, after she had been rebuilt with the 600c class boiler. Smoke deflectors had also been fitted, transforming the appearance of the class from the original. The buffers had also been removed. 609 was the last loco to be fitted with a 600c boiler, was coal fired all her life, and was the only 600 named. This came about in honour of the Royal Visit of the Duke of Glouchester in the late 1920s. 609 was also the only 600 to acquire the silver smoke box front which was the distinguishing mark of the 500 class 4-8-4s.

The underframe, wheels and motion of the Mehanotehnika USRA light Pacific were used - the wheel size and spacing being exact for the 600. The superstructure was constructed from plasticard, and the model was painted with a Badger air brush. The lining out, name and number plates were done by hand, using a draftsman's pen.

SWR 40 Class Diesel
Built by Philip Larmour

The model is converted from a Mehanetchnika Alco RS2. The bogies have been shortened, the footplate modified and the fuel tank, cab and cowcatchers have been replaced.

NSW BRANCH CUP - For Scratch Built Rolling Stock

LSWR 6 Wheel Brake/Third Coach
Built by Peter Betts

Coach No 125 is scratch built from nickel silver. The panelling is of nickel silver strip soldered on. The roof and torpedo vents are fabricated from brass. The underframes are epoxy moulding from patterns made by this modeller. Wheels and knuckle couplers are commercial items.

VIC BRANCH CUP - For Kit Conversion

LSWR 6 Wheel Brake/Third Coach
Built by Peter Betts

Coach No 11 is made from a Peter Betts kit. The patterns for this kit were eventually used to make up a coach which is entered in the Scratch Built category.

NSWGR CHG Guards Van
Built by James McInerney

This model was constructed using the sides from a Friedmont CHG kit, the rest of the kit having been scrapped because of faulty castings. The cast on handrails were removed and replaced by wire ones, and the roof was represented by glueing strips of newspaper across the wood former. The rest of the van was fabricated from styrene sheet and rod. The prototype was built in the late 1950s and used all over the State. None now remain, all having been converted into the modern CHG designation.

NSWGR Travelling Domestic Water Tank
Built by James McInerney

The model was constructed using one of the early series of CMJ Models K wagons. The door casting was cut out, and the wagon then assembled as normal. The tank was constructed from Plasticard. The completed model was painted with a Badger Airbrush and lettered by hand with a draftsman's pen.

The prototype was found all over NSW, and was used for supplying water to outlying staff for drinking and other domestic purposes.

CANDEMAH CUP - For Lineside Structures

LSWR Footbridge
Built by Peter Betts

The model is based on the prototype at Wool Station and is typical of LSWR station footbridges. Fabrication is entirely from brass sheet and wire. The gas lamps are also scratch built.

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THE POP VALVE!

FOR READERS LETTERS

The Editor
AMRA Journal
Dear Sir

Just a few comments on the cover photograph and caption of Journal No 131. When Comeng took over the manufacture of the Alco locomotives, the engineering responsibility for the M636 locomotive became my problem.

Your cover picture shows three M636 locomotives. Similar types may be found on Hammersley Iron and Robe River Railways.

However, the Comeng locomotive varied somewhat from the Goodwin locomotives. I decided to improve the air flow to the traction motors and to the engine turbo-charger, and this was done by increasing the depth of the air duct under the engine.

To allow for the change in underframe design, incorporating the air duct, the fuel tank shape was also changed, reduced in height and increased in width to maintain the capacity.

The new fuel tank shape can be seen on the leading locomotive in the cover photograph, and this loco is therefore a Comeng Alco!

The second loco has the familiar semi-circular wing tanks, and was built by Goodwins. The third loco is a little difficult to identify, but could also be a Comeng Alco.

Minor changes also continue to creep into the M636 locomotive fleets, depending on customer requirements. All later locomotives now have squared off water header tanks for the cooling system just near the radiators. The Robe River locomotives have roof mounted five chime horns, Hammersley locomotives have the horn behind the headstock and sloping side steps, with reinforced cab sides, etc.

Hammersley also has larger cab space, obtained by moving the contactor compartment rearward about 15", this also moves the bonnet side internal filters about the same amount towards the engine.

Bogies also change, earlier locos were fitted with Alco 'Hi Ad' bogies or Defasco bogies. Now all late M636 locomotives are fitted with Defasco bogies.

For modellers this adds considerable confusion, so one must be careful to stick to the road number and railway insignia of the prototype if scale accuracy is to be maintained on M636 models.

Yours faithfully

S Dick

The Editor
A.M.R.A. Journal

Dear Sir

I have a few words to say which you can publish in 'Pop Valve' if it still exists, or otherwise as a separate article. I leave it to you!

I received my Sept/Oct issue of Journal only yesterday (13/3/79). Am I unfortunate, and did the other members receive theirs before Christmas, or are we all in the same boat? In the days of the duplicated Journal when everything from the writing of copy to the addressing and mailing was done by hand, we sometimes fell a little behind, but five months, I ask you! Would it not be better to skip a few months and date each number nearer to the real date of issue?

I have recently been rereading my old duplicated copies and have found them a veritable mine of interest and information on a wide range of railway subjects, both model and prototype, much of which could, in the absence of original copy, be reprinted since there must be many members now who were either not born or very small when it first appeared. As a contributor in those days of well over 20 articles, I have often considered taking up my ball point again, but find that what I said then was about all I had to say, and any further contribution would be little more than repetition. But leaving my own efforts aside, there were many articles by Jack McLean, Broughton Boydell, Ivan Laszlo, Steve Suggitt, Arthur Harrold, Rick Richardson and others too numerous to mention which would bear reprinting. Jack McLean, in particular, had the right ideas - simple layouts based on and operated according to prototype practice. I think I can say that the Journal of those days was a publication to be proud of.

And what of the new generation? Is there no one with ideas and information or the ability to set them down in writing? I should have thought that the rise in educational standards and opportunities compared with those of my own youth would have made the beneficiaries more articulate, not less so. Rise up ye heirs of the ages and inheritors of the future! Think up some thoughts, grasp your pens and set them down (the thoughts I mean, not the pens), and if you can't write, try typing. I am sure the Editor wont mind!

Jack Makin

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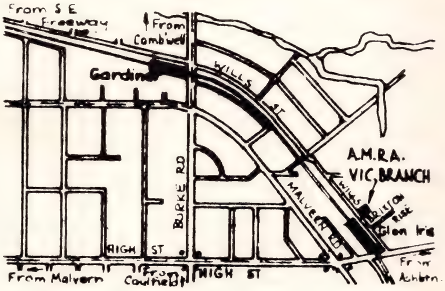
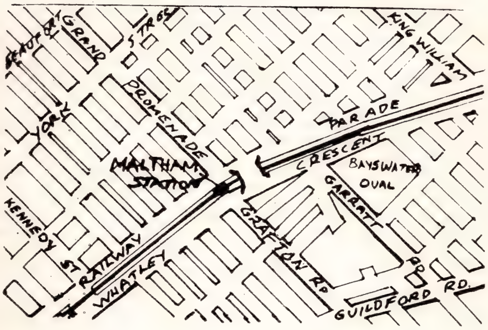
BRANCH NOTES

VICTORIAN BRANCH NOTES



General meetings are held on the second Thursday each month commecning at 8 p.m. at the clubrooms, 92 Wills Street, Glen Iris. The clubrooms are open from 7.30 p.m. on these nights for operation of your H.O. or N gauge trains on the club layouts. Working Bees with some operation on the layout are held each Wednesday night with the exception of the Wednesday night before the general meeting.

WESTERN AUSTRALIAN BRANCH NOTES



The Branch meets at Meltham Station, on the first Monday of each month, at 8.00 p.m., and at other times as indicated on your program in the "Branch Line". Visitors and prospective members of A.M.R.A. are always welcome at any of our meetings. For further information, contact the Secretary, Mr Craig Hartmann, P.O. Box 60, Maylands.

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NMRA DATASHEETS
MODULAR MODELING
BENCHWORK
D-M/M-2

BENCHWORK

Benchwork should be designed to satisfy the operational, aesthetic and practical criteria discussed under planning. Very successful and useful modules have been built as narrow 'bookshelf' units, hexagons, squares, with curved side framing and as trapezoids in different proportions, as well as the more common rectangular designs. All of these conform to the specifications.

For best strength to weight ratio diaphragm construction, using a perimeter frame and a solid top, is the best. It minimises the effects of racking and torsion when the module is moved.

Use of lightweight materials is recommended where possible. Pine or redwood lumber instead of fir can be used for framing and legs. In the smaller scales, foamboard can be used instead of plywood for the top. Proper bracing rather than massive materials will provide the necessary rigidity and strength. Legs should be easily and quickly attached, and provide solid, independent support for each module. Self-contained, internally storing permanently attached legs are recommended. Where possible, adjustment to both display and operations height should be incorporated in the leg design, or alternate detachable legs should be provided.

All joints should be glued and screwed. Nails tend to work loose and should be avoided. So that time is not wasted at meets and shows, each module should be designed to be set up and operational in a maximum of 10 minutes. A self-explanatory method is preferred so that one person, unfamiliar with the module, can set it up unaided.

For clear reference during construction and operation, the following identifying conventions for benchwork components are used.

side designation code

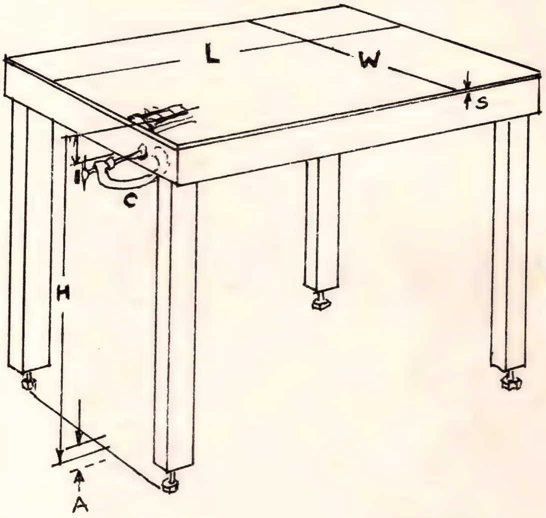
through track colour code

through track feeder sockets

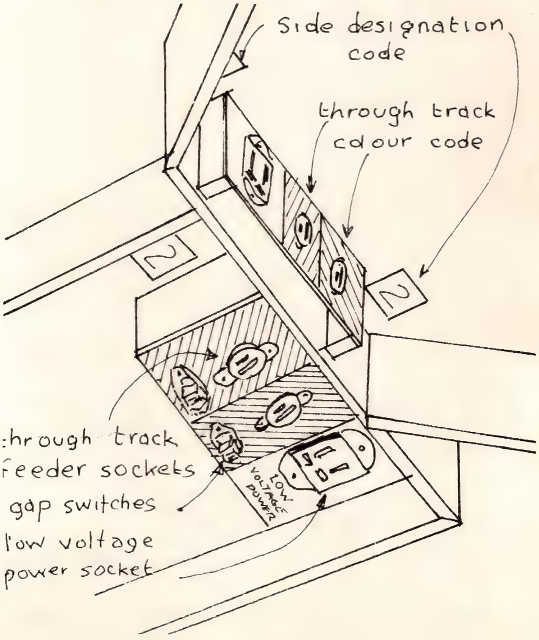
gap switches

low voltage power socket

The builder arbitarily designates one side of each interface as side 1, and the opposite as side 2. These are then clearly labelled at each interface where connections to the adjoining module are to be made.



L	Length	variable[1]
W	Width	variable[1]
H	Height - floor to railhead	Display: 1000 mm (39-3/8")[2]



		Operations:	1150 mm (45¼")[2]
A	Leg adjustment		±25 mm (1")
I	Interface height	Minimum:	85 mm (3-3/8")
		Median:	110 mm (4-3/8")
		Maximum:	130 mm (5-1/8")
S	Surface thickness	Maximum:	20 mm (¼")[4]
C	Clamps[5]	Opening:	Minimum 60 mm (2½")
		Depth:	Minimum 30 mm (1¼")

1 See planning section notes for suggestions.

2 Specified heights are measured to railhead. Plan leg lengths accordingly.

3 Framework members should be minimum finished size 2 cm x 6.5 cm (nominal 1" x 3") lumber. This is the smallest size providing necessary strength and rigidity. Larger scales may wish to use larger sizes to a maximum finished dimension of 2 cm x 9 cm (nominal 1" x 4") lumber. Keeping within these limits will maintain dimension 'I' and assure units can be clamped together. Add the total dimension of framing + surface 5 + ballast board + tie thickness and rail code before construction to be certain dimension 'I' is not exceeded.

4 To ensure adequate clamping surface at interfaces, this dimension must not be exceeded. For smaller scales through HO, a surface of 8 mm finished thickness (nominal 3/8") material is adequate. For larger scales, a thicker surface, up to a maximum of 20 mm finished thickness (nominal ¼") may be used.

5 One clamp per interface is needed. The area of the framework directly beneath each through track would be kept clear of electrical components so that clamps can be placed here for set up

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NMRA DATA SHEETS

MODULAR MODELING

Trackwork

Issue Date July 1978 | $D\frac{M}{M}3a$

General: All through tracks should be designed with rail code and clearances adequate to handle all types of equipment. Clearances for all through tracks should conform with NMRA Standard S8.

Access: All trackwork, including that in tunnels and structures, should be accessible for clearing and maintenance. Structures built over track should be removable unless other access is provided.

Smoothness: All track should be free of kinks and vertical alignment of the railhead should not vary more than 1/2% (1 unit in 200).

Grades: Grades may be used in a modular system as appropriate to the prototype being modelled. All transitions into and out of grades must meet the smoothness requirement. For standard gauge mainlines, it is recommended that the maximum grade on through tracks not exceed 2% (1 in 50).

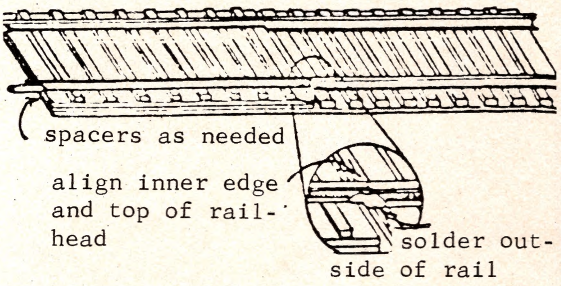
Gauge: All track and turnouts must meet appropriate NMRA standards for the gauge modelled (S3, S13 or S15).

Ballast Board: Use of wood or cork profiled ballast board is recommended on through track. It helps dampen noise and facilitates cutting the ballast board relief and maintaining smoothness.

Rail Type and Code: Track and rail may be commercial components or hand laid. Use nickel silver rail only. Minimum rail code for through tracks and for interface connector tracks is shown below. The interface connector track rail code may be used throughout the module if desired.

Scale	Minimum through track rail code	Interface connector track rail code
Z/Nn	40	65
N	55	80
TT	55	55
HOn3	55	70
HO	83	100
OO	83	100
Sn3	83	100
S	100	100
ON3	83	100
O	125	125

Connector Track: Where the interface connect or track rail code is used throughout the module, ONE connector track should be provided for each through track. Where other code rail is used in the module, a transition connector track should be provided for EACH interface location. These can be constructed by mating equal lengths of the two rail codes on a common base and soldering together. Where rail code other than designated interface standards is used, the rail code should be indicated at each such interface.



The standard length of connector track for each scale/gauge is shown below. In some cases commercial track sections can be used. Otherwise the connectors can be cut from flextrack or built up from rail and ties on a solid base.

Z/Nn	110 mm snap track section
OO	150 mm cut flextrack
N	120 mm snap track section
Sn3	150 mm constructed piece
TT	150 mm cut flextrack
S	150 mm constructed piece

HOn3	150 mm cut flextrack
On3	150 mm cut rail piece
HO	150 mm cut flextrack
O	150 mm cut flextrack

Curves: In order to assure the operation of the widest variety of equipment, the radii of curves on the through tracks should not be less than that shown below. These are based on NMRA AP11 data and actual experience in various scales.

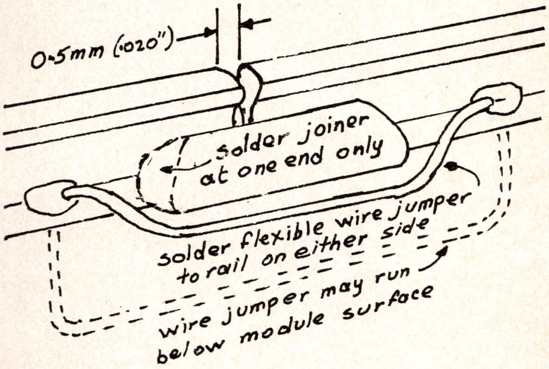
Scale/ Gauge	Radius in Millimeters	Radius to nearest ¼"
Z	400	15¾
Nn	195	7¾
N	550	21¾
TT	730	28¾
HOn3	610	24
HO	1000	39¼
OO	1150	45¼
Sn3	760	30
S	1375	54
On3	1065	42
O	1830	72

All curves should begin and end with transitions. Centrelines may need to be widened for smaller radii to provide clearance for large equipment, as shown in NMRA standard S8. Centrelines should return to normal at module interfaces.

Turnouts: To permit the most flexible operations, all modules having two or more through tracks should provide a crossover, either left or right hand, between each pair of tracks. Turnouts with live frogs insure best electrical continuity. The most reliable is a carefully built hand laid turnout. Size of turnouts will vary with the scale, but the following frog numbers are the minimums recommended for reliable operation.

Scale/ Gauge	Through Track Crossover	Other Track
Z	8	5
Nn	5	3½
N	8	5
TT	7	5
HOn3	5	4
HO	6	4
OO	6	5
Sn3	5	4
S	6	6
On3	5	4
O	6	5

Rail Joiners: Metal rail joiners should NOT be soldered across joints. They may be soldered at ONE end to prevent slippage and increase reliability of electrical conductivity. A flexible wire jumper can be used around the joint to ensure the electrical path.


0·5mm (·020")
solder joiner at one end only
solder flexible wire jumper to rail on either side
wire jumper may run below module surface

Uncouplers: Permanently functioning uncoupling devices, either mechanical or magnetic, should NOT be used in through tracks. Only electromagnetic or hand operated uncouplers should be used in through track locations to minimise the possibility of unwanted uncoupling.

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SWING MOTION RAIL BOGIE

Reprinted from Engineers Australia
7 October 1977

Deliveries of a new railways bogie, described as revolutionary, have been made to Hamersley Iron Pty Ltd.

Commonwealth Steel Company Ltd, a BHP subsidiary, made the delivery under a $6 million contract to supply 692 bogies to the WA iron ore miner.

The new bogie, known as the Comsteel swing motion bogie, includes new features which it is hoped will overcome many problems associated with conventional bogies used in freight haulage.

It has been developed to avoid lateral instability at a range of speeds up to 120 km/h, reduce the tendency of conventional bogies to derail as the wagon rolls or twists, improve riding qualities, to reduce costly wear and damage to the rail track, bogie components and lading and minimise maintenance.

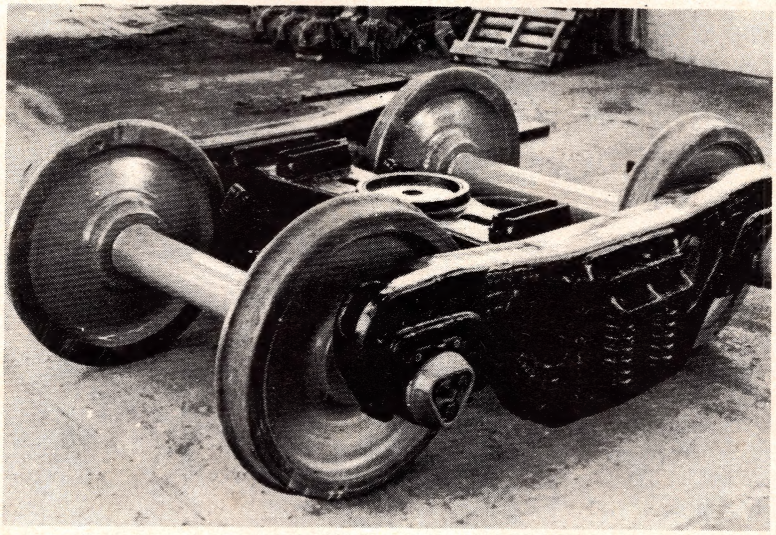
Traditionally, Australian railways have used a conventional three-piece bogie for almost all fast freight applications. It is claimed that testing of the swing motion bogie has shown its superiority over the conventional unit.

Comsteel said research using the Association of American Railroads lading damage index showed the lateral riding quality, the side to side movement, of the new bogie was up to 200 times superior to a three-piece bogie.

Vertical ride quality with a lightly loaded wagon also showed an improvement of up to 200 percent over the three-piece designs due to the 'tuned' two-stage springing of the swing motion bogie, it said. Railroad testing in the US showed that under test conditions, the hunting severity index of the swing motion bogie measured at two compared with 76 for a conventional three-piece bogie.

Performance of the bogie does not deteriorate, even though the wheels may be worn because the suspension is able to absorb rail or wheel irregularities without transferring them to the wagon, Comsteel said.

The swing motion bogie was developed under licence from the American railroad equipment supplier, National Castings Division, Midland-Ross Corporation. It was designed, engineered and tested utilising the Comsteel's own facilities.



Swing motion rail bogie

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